



## Artificial Intelligence on Traffic Cameras

**Problem Statement:** Traffic cameras deployed throughout the city provide access to a wealth of data that could be used to inform both day-to-day operations and long-term infrastructure planning. Due to limited human resources, this video feed data is often underutilized, and usually only used to verify concerns identified by other means. Meanwhile, alternative approaches are used to collect the same data in these video feeds by other means (e.g.: annual vehicle counts). These approaches are costly and provide only a small snapshot in time, compared to the continual data available from these camera feeds.

**Objective:** Apply artificial intelligence (AI) to traffic camera feeds, using SwRI's ActiveVision system, to extract actionable data from a subset of the traffic camera video feeds across the city. This data will be used to drive real-time decision making and archived and queried against to inform long term planning by extracting vehicle and pedestrian traffic patterns across extended periods of time.

**Hypothesis:** We believe AI on city traffic camera feeds will 1) empower TCI to respond quicker to pressing issues, 2) provide sufficient data to replace existing stand-alone roadway data collection efforts, and 3) provide TCI with broad-reaching, rich dataset that can be leveraged to inform long-term infrastructure planning.

### Addresses City Manager Priorities:

- Data Driven Decision-making – Provides access to continuous feed of actionable data from existing camera infrastructure.
- Customer Service – City can be proactive and address traffic issues quickly, before complaints arise.
- Financial Sustainability – Identifies operational efficiencies and ensures equitable allocation of resources.

### Research Questions:

Phase 0	(SwRI Internally Funded) Currently being developed with City's needs in mind; expected availability early 2020.
Phase 1*	Identify small subset of traffic cameras throughout the City with placement conducive to collecting the highest priority data for TCI and pilot the system on these cameras. Deploy the beta system here and iteratively enhance.
Phase 2	Expand initial deployment to broader range of cameras across the city.
Phase 3	Can we utilize the data reported to drive day-to-day operations?
Phase 4	Can we identify patterns in the data archived across a longer period to identify infrastructure needs not evident through more standard approaches?
Phase 5	Can we apply lessons learned from the initial pilot to address other issues proactively/strategically?

### Approach:

- 1) Prototype/Technology: (SwRI Internally Funded) Build beta ActiveVision to extract actionable data from City traffic cameras
- 2) Experiment/Application: Pilot ActiveVision on small subset of City cameras, measuring effectiveness/reliability of the system
- 3) Report: Document wins, barriers, lessons learned on how the technology can improve City operations

### Roles & Responsibilities:

	Internal	External
<b>Executive Champion</b>	Art Reinhardt (TCI)	Walt Downing (SwRI)
<b>Lead Facilitator</b>	Kate Kinnison (Innovation)	Clay Weston (SwRI)
<b>Principal Investigator</b>	Marc Jacobson (TCI)	Dan Rossiter (SwRI)
<b>Technical</b>	TBD (TCI)	SwRI: Kyle Widmann, Sabrina Mosher, Edward Vear
<b>Report</b>	Kate Kinnison (Innovation)	TBD

### Project Plan: \*Reflects phase 1

- Data collection and initial analysis
- Deploy ActiveVision at City datacenter and select/configure initial cameras to be monitored
- Iterative analysis of reported data and tuning of ActiveVision to enhance capabilities
- Review initial results and further analysis
- Phase 1 Report